

# Design ENGINEERING

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- 18 Halifax's Enginuity provides practical solutions to unique problems
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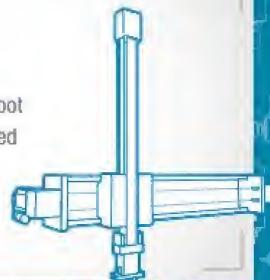
## Cancer sKanner

Canadian engineering students' thermal melanoma detector wins international design prize.

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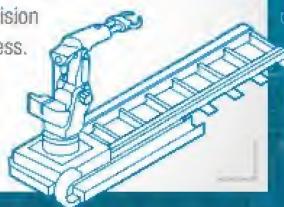
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## Pocket Doctor

**A**ccording to the Canadian Institute for Health Information (CIHI), Canada will spend \$242 billion on healthcare in 2017, an increase of almost 4 percent over last year. Per Canadian, that number translates to \$6,604, which is generally in line with most European countries but approximately half that spent per capita in the U.S. (CAD\$11,916).

However, an OECD Health Division study, released early this year, revealed that approximately 20 percent of healthcare expenditures across OECD countries is wasted in some fashion. In a healthcare system as large as in the U.S., that percentage adds up to some astronomical amounts. According to a 2012 study by the National Academy of Medicine, the U.S. wasted nearly \$750 billion of its overall healthcare expenditure, \$210 billion of which went to unnecessary health services.

While there are numerous initiatives to stem the problem, some medtech start-ups are taking a different approach. Take, for example, the finalists in the Qualcomm Tricorder XPRIZE. Five years ago, we first reported on the international contest to design a Star Trek-inspired, consumer-oriented medical diagnostic device. Hopefuls were tasked with creating a user-friendly system that could accurately diagnose at least 13 medical conditions (as well as the absence of disease) across 30 individuals.

Initially, 300+ entries hoped to share in the \$7 million prize but, by the end of 2014, eight remained. Among them was Cloud DX, the only Canadian company on the short list. In fact, the Kitchener, Ontario-based company was the first Canadian team to make the final cut of any XPRIZE competition. That shouldn't come as a surprise. One look at the Cloud DX Vitaliti tricorder's slick industrial design and you could easily imagine it lining Best Buy shelves, the perfect gift for the hypochondriac on your Christmas list.

The tricorder's insides are just as sophisticated. Capable of continuously monitoring five vital health metrics (e.g. ECG, blood pressure, O<sub>2</sub> saturation, and body temperature), it also allows users to collect blood and urine samples. Patient stats and test results are then processed in a base unit and transferred to a cloud-computing platform where AI algorithms analyze the results and return a diagnosis to an app on the user's cell phone.

For all its capabilities and three years of further refinement, the Vitaliti tricorder finished a strong third this past April, when the XPRIZE winners were announced. To be fair, none of the eight finalists officially met all the contest's criteria but the Vitaliti did receive the "Bold Epic Innovator Award" and a US\$100,000 check toward its further development.

Ultimately, the hope is that these mobile and autonomous devices could ease stress on healthcare systems groaning under the weight of an aging population. It's easy to imagine a Vitaliti paired with telemedicine services, for example, or even an AI personal assistant like Google Home or Amazon's Echo to pre-screen patients and prevent unnecessary doctor and ER visits.

That might seem impersonal, but a medical device like the Vitaliti could have a significant impact on healthcare costs. And in a world where the U.S. wastes close to as many health services dollars per year as Canada spends on its entire system, an AI driven "pocket doctor" may just be the right prescription.

Mike McLeod



I enjoy hearing from you so please contact me at [MMcLeod@design-engineering.com](mailto:MMcLeod@design-engineering.com) and your letter could be published in an upcoming issue.

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† Flow (SCFM) measured at 87psi with AP at 14.5psi

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# Stratford becomes hub for autonomous vehicle innovation

The Ontario government officially opened the Autonomous Vehicle Innovation Network (AVIN) Demonstration Zone in October. Located in Stratford, Ontario, the Demonstration Zone is a first-of-its-kind initiative that will enable self-driving car technology researchers to innovate and test autonomous vehicles in real-life scenarios, the province says.

According to AVIN's website, "The Demonstration Zone is a site where technologies may be tested, validated and showcased in live scenarios in accordance with applicable laws and regulations using vehicle platforms such as city buses, fleet vehicles and OEM vehicles."

Initial passenger vehicles at the AVIN Demonstration Zone will showcase connected vehicle and infrastructure technologies, followed later by vehicles with autonomous driving capabilities. In addition to the vehicle fleet, the Zone will take advantage of Stratford's 12-square-kilometre-wide Wi-Fi network, high-speed broadband and standard cellular LTE access.

The Demonstration Zone is one part of the province's overall AVIN strategy. In addition to the Zone, the network will include a Research and Development Partnership Fund, Talent Development Program (TalentEdge) and promotion of Regional Technology Development Sites across Ontario.



To foster AVIN, the province of Ontario has committed an \$80 million investment over five years and is partnering with Ontario Centres of Excellence to make Stratford an autonomous technology hub.

According to the province, Ontario is considered the top vehicle-producing region, and a top stop for information and communications technology companies, second only to California. With more than 10,000 employees across 50 companies and organizations in Ontario, the self-driving/connected vehicle sector is growing and the province says it is investing to help remain a leader in the field.

[www.avinhub.ca](http://www.avinhub.ca)

## UP FRONT

### Schneider Electric appoints Canadian President

Schneider Electric appointed Susan Uthayakumar as Country President, Canada effective January 1, 2018. A 13-year Schneider Electric veteran, Uthayakumar was most recently Vice President, National Sales, Canada, responsible for sales strategy of the company's electrical distribution and industrial automation products.



Susan Uthayakumar, Country President, Canada, Schneider Electric (CNW Group/Schneider Electric).

[www.schneider-electric.ca](http://www.schneider-electric.ca)

### Omron expands into new Montreal office



offices in a Dorval, Quebec business complex. In addition to office space, the new office includes an expanded Montreal test lab that allows customers to engage in hands-on testing of automation solutions. The company says the lab is outfitted with robots, motion control, machine safety, HMI, vision, sensors and control components that can be tested together, simulating integrated interactions. "Now that we operate as a Pan-American business, we are able to provide uniform service and support for our French-speaking customers' needs," said Peter Brouwer, Omron Canada General Manager.

[www.omron247.com](http://www.omron247.com)

Omron Automation Americas announced the opening of its expanded and relocated Montreal



Chartwell founders, Mark and Steve Boehmer.

### Turck Chartwell becomes Turck Canada Inc.

In October, Turck announced that it had acquired the remaining 50% interest in Turck Chartwell Canada Inc. and thus is 100% owner of the new subsidiary. In January 2018, the company name will become Turck Canada Inc. Turck initially acquired the first 50% interest in its long term Canadian sales partner Chartwell Automation Inc. in 2014. Mark and Steve Boehmer, the two founders of Chartwell, have signed long-term management contracts. They will continue to lead the company as President and VP of sales and marketing.

[www.chartwell.ca](http://www.chartwell.ca)



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Just five to six pounds of pressure is required to operate the electronically-controlled Ford Performance Drift Stick, significantly less than a true Rally hydraulic handbrake. (Photo courtesy of Ford.)

#### Ford designs rally-inspired electronic handbrake

Ford announced that its engineers have perfected an electronically controlled handbrake, called the Ford Performance Drift Stick, and will install it in the company's Focus RS for approximately US\$1,000.

The Drift Stick – internally called Project Wicked Stick and led by Ford Performance program manager John Wicks – was born out of the Focus RS' industry-first Drift Mode and developed by the same team.

The aluminium lever installs, via a USB cable to the diagnostic port, between the driver's seat and manual transmission. Pulling it causes the Focus RS's antilock braking system to lock up the rear wheels while opening the rear-drive clutches to induce drift without stalling. The results are clutch-free drift turns very similar to the experience of a real rally car.

"I think it's really cool that Ford Performance is offering customers a way to create large-angle drifts in the Focus RS," said professional rally driver, Ken Block, who consulted in the stick's development. "Obviously, it's something that I'm really passionate about having been a part of the development of the production vehicle, so it's exciting to see it come to life. It definitely makes the car even more fun to drive."

Ford says the Drift Stick is available for customers in the U.S. and Canada but emphasizes that it's intended for track use only. The kit includes the Drift Stick lever, mounts and circuit board with professional calibration functionality.  
[www.ford.com](http://www.ford.com)

#### Magna develops innovative plastic welding technique

Magna International announced that it has developed a technique for joining thermoplastic materials, called torsional welding, to help automakers cut weight and costs. The process, developed by the Ontario-based company at its exteriors plant in Liberec, Czech Republic, features a high-speed twisting motion that creates enough friction-based heat to join a plastic bracket to a thermoplastic fascia.

The result is an approximate 10 percent weight reduction, Magna says, because it allows thinner materials to be joined, which in turn reduces material costs. Torsional welding is currently used to make the front fascia of the 2017 Skoda Octa-



Magna's torsional welding process is used to make the front fascia of the 2017 Skoda Octavia. (Photo credit: Magna International Inc.)

via, but has potential for other applications where materials of similar composition need to be joined, the company said.

For example, torsional welding may further driver assistance systems. As automotive fascias have become heavier, due to the addition of sensors, torsional welding could offset that weight on the outer skin and allow more sensors to be added without impacting overall vehicle weight.

The Society of Plastics Engineers Detroit Chapter recognized Magna's torsional welding process with an innovation award at its recent TPO conference in Troy, Mich.

[www.magna.com](http://www.magna.com)



Lockheed Martin engineers will design an Extra Large Unmanned Undersea Vehicle, Orca, for the U.S. Navy. (Image courtesy Lockheed Martin.)

#### Lockheed Martin to design U.S. Navy's unmanned undersea vehicles

Lockheed Martin won a \$43.2 million contract to design and build Orca, the U.S. Navy's Extra Large Unmanned Undersea Vehicle (XLUUV) program. The vehicle platform will be designed to perform a variety of missions, the company says, including surveillance and reconnaissance; mine countermeasures; warning notification; and anti-submarine warfare training. To facilitate this multi-mission objective, Orca will be designed with a reconfigurable payload bay.

A critical benefit of Orca is that Navy personnel launch, recover, operate and communicate with the vehicle from a home base and are therefore far removed from hazard.

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and their missions," said Frank Drennan, director, submersibles and autonomous systems, business development.

Lockheed Martin employees in Palm Beach, Florida, will perform the work on Orca, with additional support from employees at the company's locations in Manassas, Virginia, Syracuse, New York, and Owego, New York.

[www.lockheedmartin.com](http://www.lockheedmartin.com)



### GM partners with UOIT for STEM Education

General Motors announced it is partnering with the University of Ontario Institute of Technology to help develop STEM-focused initiatives. The goal of the Science, Technology, Engineering and Math (STEM) program is to support and encourage children, through hands-on interactive learning, experience the real-world impact of STEM-based careers. According to the company, more than 8,500 students will benefit from these initiatives over the next few years.

The initiatives include the Elementary School Teacher Professional Development Program that will promote STEM education to Durham Region elementary school teachers. The c\_wonder Maker Truck program will offer hands-on advanced robotics engineering workshops at elementary and secondary schools. In addition, Oshawa Assembly Plant Scholarships will reward three Mechatronics Engineering students each year for outstanding academic achievement. The ENG SQUAD Summer Camps, an annual program for students in Grades 4 to 8, will focus on the practical application of science and math to solve every day problems.

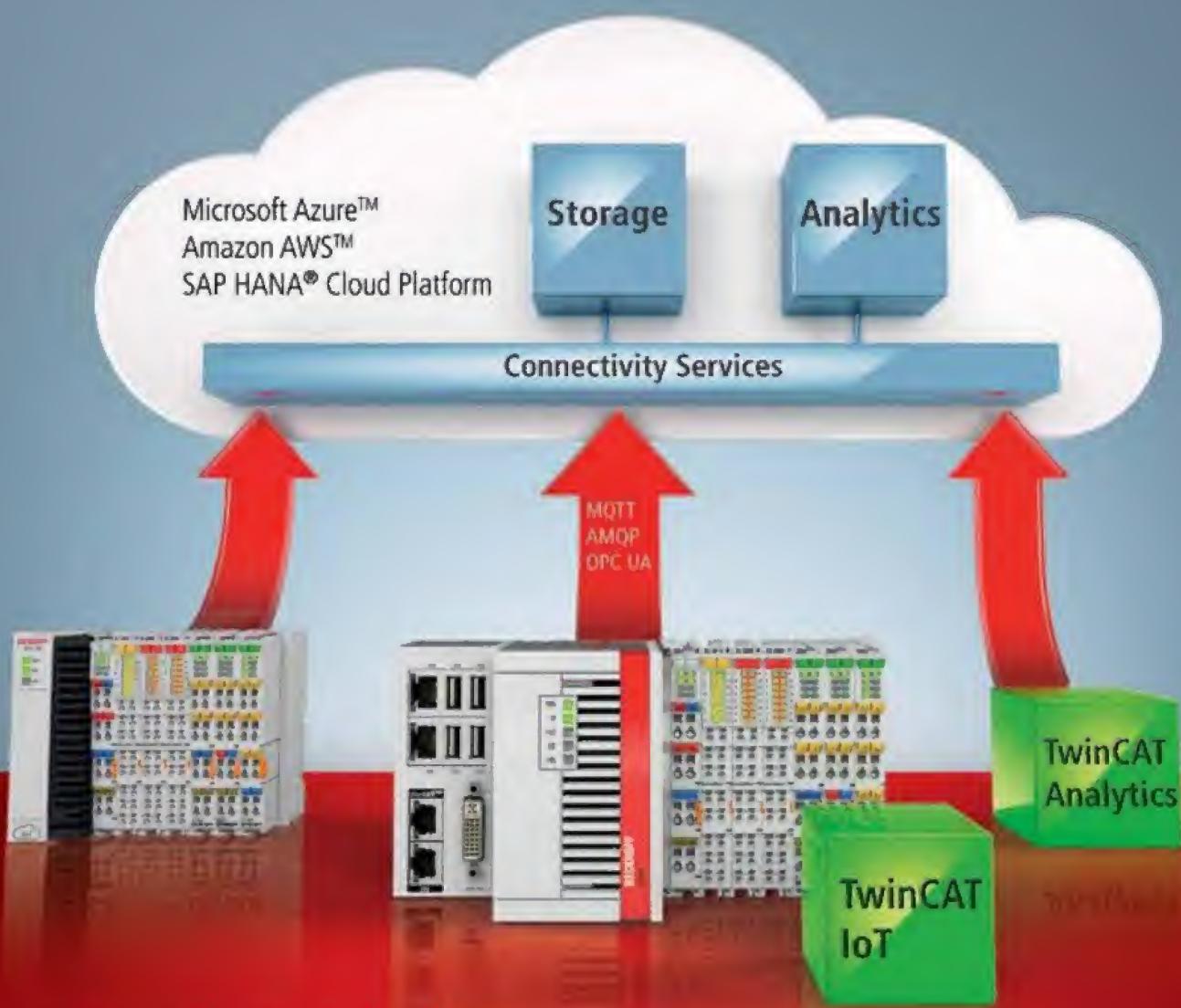
The impetus for this collaboration comes from the fact that seventy per cent of Canada's top jobs require a STEM type of education. However, less than half of secondary school students graduate with any senior STEM courses. With GM Canada's investment, the university can offer two influential new STEM initiatives to the community.

"Thanks to GM Canada's support, we launched our new professional development program for Durham Region teachers in the areas of STEM," said Dr. Janette Hughes, Canada Research Chair in Technology and Pedagogy with the university's Faculty of Education.

"GM Canada's generous investment shows their commitment to the university and to strengthening our community as a whole," said Dr. Tarlochan Sidhu, Dean, Faculty of Engineering and Applied Science. "Their continued contributions to our faculty's outreach programs will help inspire youth in Durham Region and surrounding communities to explore STEM fields and propel them into exciting careers in engineering."

GM also announced its plan to invest \$10 million globally by the end of the year to advance and improve STEM education. [www.gm.ca](http://www.gm.ca)

# System-integrated IIoT with standard PC-based control



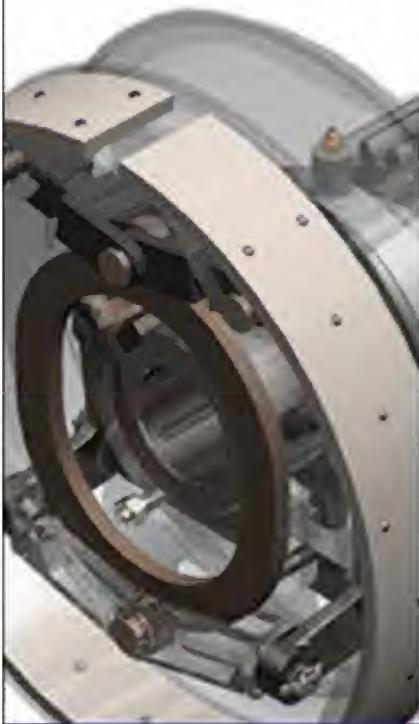
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# Inside IronCAD 2018

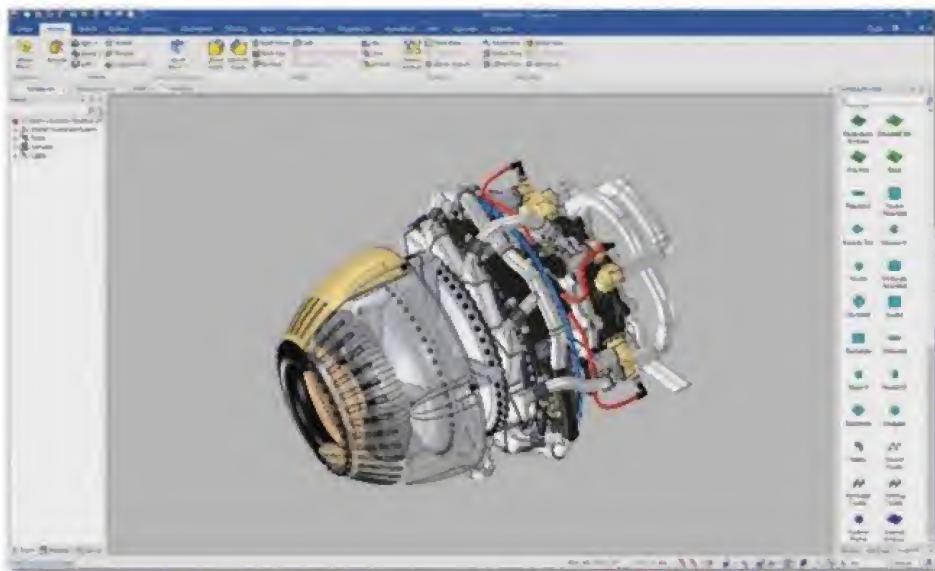


Figure 1: Zooming and panning a large assembly model in IronCAD 2018

**MCAD underdog continues legacy of innovation and ease-of-use with its latest release.**

By Ralph Grabowski

Over the industry's history, there have been a few MCAD systems that shook up the way we think design ought to be done. They make their impact, change our way of working and then fail.

For example, Alibre proved that MCAD could run on a remote server and be displayed over the Internet on a local computer. Today, we call this "CAD on the cloud," but the online version of Alibre failed, because in 2000 the Internet was just too slow. The program was rewritten as a desktop program and remains there to this day.

XCAD was launched at a jaw-dropping price of \$500 in an era when MCAD was supposed to cost \$5,000 or even \$50,000 per seat. Then, the upstart CAD package

made the eye-raising claim it would sell a million copies worldwide – at a time when 100,000 was considered a really big number. It also failed when it couldn't update the software quickly enough. Last I heard, it was being sold only in its native Hong Kong. (Note that there are many other unrelated systems named "XCAD".) Nevertheless, it pioneered the idea that MCAD software could cost a trivial \$500 or even \$0, and that a vendor could sell a million copies or more.

TriSpectives introduced us to interactivity in MCAD, such as dragging-and-dropping 3D IntelliShapes from catalogs onto models, complete with mating (a.k.a. geometric snaps). It had 3D Illustration to generate 2D drawings of 3D models that remember they are 3D. SmartRender adjusted rendering modes to maintain speed and the TriBall cursor (a.k.a. manipulator) interactively edited solids.

In fact, TriSpectives presented such radical ease-of-use that another reviewer proclaimed the new program to be "the Pro/E killer." But Pro/E flourished while

TriSpectives was killed off. Sales failed to match the hype, and I'd argue that so much interactivity was mind-blowing to staid engineers. Real MCAD was, after all, supposed to be difficult to master, not as easy to use as MS Paint.

Following its collapse, TriSpectives was split into parts: Autodesk bought some of the technology, while the MCAD program was rebranded as IronCAD. Today, it's owned by Chinese software company CAXA under the name of IronCAD LLC, and is priced at around \$4,000. The primary users of IronCAD are machine designers and sheet metal fabricators.

#### IronCAD's Unique Features

It's a rare to find an MCAD program today that doesn't have every single one of those user interface innovations first introduced by TriSpectives' brilliant programmers. Yet, IronCAD continues its streak in being unique. It is, I think, the only MCAD system that offers both mainstream modeling kernels – Parasolid or ACIS. You choose one of them when you install the program. For instance, you would choose Parasolid when you work a lot with Solidworks or Solid Edge/NX; choose ACIS if you work with Inventor or BricsCAD.

Well before Siemens PLM launched Synchronous Technology for doing both history-based and direct modeling in one model, IronCAD was the first to combine the two

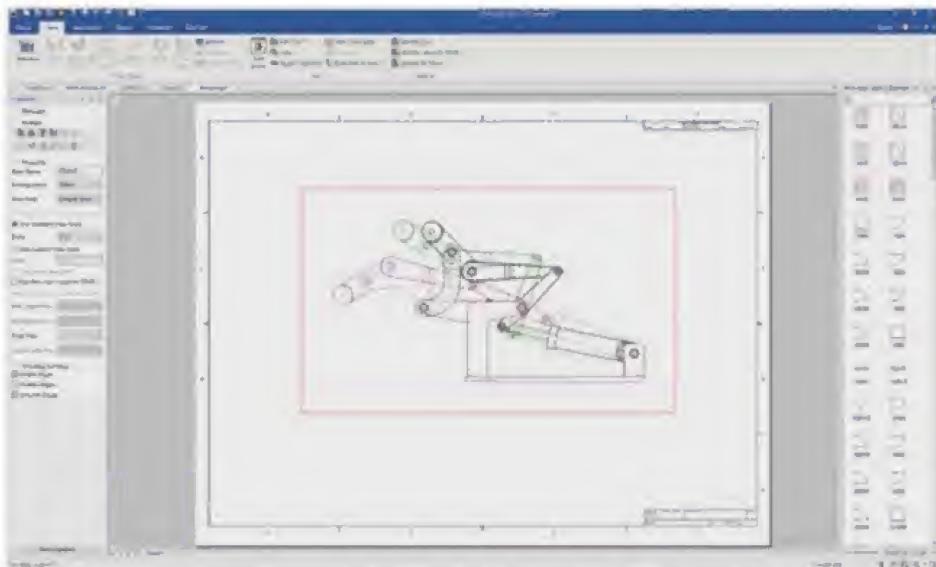
modeling systems.

IronCAD 2018 retains all the UI functions from that first release and has gained more in the following two decades, naturally. Flexible Shapes are a more convenient version of IntelliShapes; as you place them, they cut automatically through parts and – if necessary – prompt for a size.

Here's an example of the intelligence in IronCAD: Model a tube and then cut 45 degrees off. When you place the next tube, IronCAD uses the same stock and cuts 45 degrees off the new item, automatically.

Unfortunately, not all IntelliShapes are Flexible Shapes, but IronCAD representatives tell me they are adding more to catalogs as customers request them. In fact, the company is making the design intelligence in Flexible Shapes available to users other than designers. They see the built-in ease-of-use suitable for sales people, so they can put together a preliminary design while seated with the customer. Additional industrial parts are available free from online sites, such as Traceparts.

In traditional MCAD, one part is modeled per drawing (or tab), and then multiple parts are joined into an assembly. IronCAD does not have that limitation, because its drawings can have as many parts as you want; creating an assembly is as easy as selecting the parts and clicking the Assembly button.



**Figure 2:** IronCAD drawings can include multiple states of a mechanism shown in different colors



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Figure 3: Viewing an IronCAD 3D model in the Chrome Web browser

#### IronCAD 2018

To make it easier to start with IronCAD 2018, there is a new-user interface that reduces the commands displayed by the ribbon. For people coming over from Inventor or Solidworks, a sketching starts on the xy-plane, as they would expect, but this isn't the way IronCAD normally works.

Pressing the 'S'-key brings up an on-screen interface that has been in IronCAD for a long time, but now appears at the cursor and has a new ring appearance; it is called the "automatic heads-up display." The content of the ring changes, depending on the current operation – such as working with surfaces, sketches or sheet metal – and the commands displayed by the ring can be customized. The folks at IronCAD figure it has the added advantage of exposing useful commands users might not even know are available.

Large-assembly performance is a big deal in MCAD these days. If your computer has a dedicated GPU, from nVidia or AMD, IronCAD 2018 will zoom and rotate very large assemblies smoothly. The trick to changing the speed from 4-6fps to 40-60fps is to temporarily turn off transparencies, edges and reflections.

"Mechanism mode" is where we rotate parts to see them move and check for collisions. In IronCAD 2018, collision detection is faster and simpler with selected components: You see the red warning for just the couple of parts we select.

When we create drawings from mechanism, we can now specify alternative position views, to show the mechanism in its collapsed state, fully extended state and normal state. Each of the states can have a different style, colors and linetypes. We can dimension between the different states, to show the lengths of extensions and angles of rotation.

The software's shrink-wrapping function simplifies models. This is useful when sharing models, to reduce the size or hide proprietary aspects. With it, we specify which parts we want to keep and which to remove, such as all holes smaller than a certain size or all hidden parts.

IC Web Viewer exports the model as an HTML file so that any modern Web browser can view it. There are several types. The full or low-data versions are for laptops or mobile devices while local or server versions are for local networks or for Web servers. When opened in the browser, we can toggle the visibility of parts, change viewpoints, section the models and set different render types.

The new feature I like the best is default templates for sheets, called Bulk Drawing Creation. The templates specify where the views should be located, as well as the view direction, flat or folded views, and even the title blocks. Elements can be toggled off, such as fasteners, surfaces and 3D curves. The automatically-generated views, naturally, can be edited and dimensioned as needed.

IronCAD 2018 supports multiple sheet templates. Once set up, a single click sets up many sheets with the specified layouts. Sheets can be shared with other drawings. Related to the automation of layouts, we can now specify which edge of the sheet metal part aligns with the x-axis and the location of the origin. Selected views can be exported, such as to DWG files.

The 'S'-key for the first time is also available in sheet mode and is useful for dimensioning flat parts. New shortcut keystrokes adjust the look of each dimension, such as relocating the text and toggling post- and prefix text for individual dimensions. The properties of any dimension can be adjusted and instantly applied by IronCAD 2018; there is no need to erase and reapply, as in some other CAD packages.

A list of user-defined strings can be pre-defined – such as Typ, Common, and Pre – and then quickly selected while placing dimensions. One final new feature I want to mention: Automatic hole quantities. We use it to place a leader to one hole, and the leader text reports the number of all holes of that size.

IronCAD is a remarkable product that's been leading the industry for two decades. It is priced a touch lower than other mid-range MCAD packages, but includes more than the base versions of its competitors. The remarkable new features in the upcoming release show that IronCAD hasn't lost its lead. According to the company, IronCAD 2018 is scheduled to ship around December 15, 2017.

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[www.ironcad.com](http://www.ironcad.com)

Ralph Grabowski writes on the business of CAD on his WorldCAD Access blog ([www.worldcadaccess.com](http://www.worldcadaccess.com)) and weekly *upFront.eZine* newsletter. He has authored many articles and books on AutoCAD, Brics-CAD, Visio and other design software.

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# ENGINEERING ENGINIUNITY

Halifax-based design firm provides creative and practical solutions to unique problems.

By Lindsay Luminoso

**B**en Garvey grew up sailing the high sea, crossing the Atlantic on a number of occasions in his sailboat. A mechanical engineer by trade, Garvey was inspired by his sea voyages and success in navigating naval challenges to establish Enginuity Inc. in 2003, a Halifax-based engineering design firm. Garvey wanted to build a company that could provide innovative and practical solutions to unique problems.

"We are focusing on East Coast/Maritimes market, specifically in the light industrial sector," explains Alastair Trower, Business Developer for Enginuity Inc. "It's a very limited market in terms of the size of the economy and population, so we need to be Jacks-of-all-trades types. We serve mining, fishing, traditional industries like light industrial and mechanical design perspective."

Over the past 14 years, the team has grown to 15 people who are extensively experienced with harsh environment applications. In total, the firm has completed 362 projects serving over 100 companies both in the Maritimes and across Canada.

Enginuity offers a number of different services including straightforward mechanical design for the established business community. For example, the team recently worked to repurpose a fishing boat to be used for clamping rather than lobster fishing – designing an A-frame, the deck handling gear, the cranes and perform the non-naval mechanical engineering.

The team also performs product development initiatives, whereby a company with its own engineering team will seek out the expertise of Enginuity engineers to assist with in-house project work.

"We get to a point when we essentially become an extension of a company's own internal design team," Trower adds.

However, over the years, the company has also evolved to serve a vibrant start-up community through a strong entrepreneurial sentiment.

"There is a lot of investment and creativity and a lot of start-up activity; we focus strongly in that sector," Trower explains. "We took last year as a bit of an internal retrospection. We were

The Enginuity Team (L-R):  
Natalie Lavery, Louis-Phillipe  
Manuge, Daniel Horne,  
Alastair Trower, Ben Garvey,  
Gleb Sekretta, Logan Astle,  
Jean-Marc Guindon and  
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busy on the service side, had spun out a couple of products, but we wanted to work out what kind of business we wanted to be."

The company recognized that it was fairly easy to design for a problem that already existed. But they wanted to go beyond this by designing for problems that will arise down the road – focusing on end-of-life design – and putting effort into designing a process that works to solve this challenge.

A lot of the team's learning and process development has come through designing their own products, a few of which have been spun off into separate businesses.

"Understanding the manufacturing limitations and challenges, even in our own projects, has been key for us," explains Trower.

### FIVA

In early 2013, a local anesthesiologist, Dr. Orlando Hung, came to Enginuity with an idea. After doing extensive academic research, Hung identified a problem; in Canadian operating rooms, 30 per cent of gravity-fed IV bags run dry and are missed by the clinical team.

"In an era where everything is monitored during surgery, it was concerning," says Trower. "We worked with Dr. Hung, the clinician we jointly founded the company with, to take the idea through to product."

The product is called FIVA, a class I fluid alerting device for IV bags, and took nine months to develop from idea through to finished product.

"It's a pretty basic product and the regulatory was not massive but it was definitely a good learning curve for us," adds Trower. "Getting it to market in nine months was pretty impressive in any industry but in medical, that's astounding."

FIVA was spun off into its own separate business with Dr. Hung and Garvey at the helm as president and CEO respectively. Lee Babin, a former co-owner of Enginuity, was responsible for much of the design and engineering features of the device. Trower deals with marketing and business development with the team rounding out with Barbara Campbell, responsible for commercialization.

The FIVA device has currently been sold to 30-40 hospitals across Canada and the team at FIVAMED is looking to expand opportunities into developing countries.

"I think the main takeaway is that the Enginuity team is focused on solving a problem in the most creative way," explains Trower. "The ability for us to work with start ups from a local economic perspective having somewhere where the start-up community can come and not be inundated is key."

### The Process

One of the main successes of the company is its defined design process, which the team dubbed Continuum. This practical approach to design includes 10 steps: Discover, Design, Iterate, Test, Manufacture, Deliver, Implement, Monitor, Upgrade and End of Life.

"We dovetail into particular teams," says Trower. "We try to maintain systems engineering as much as possible. We are very much hands-on, practical, being out there, seeing and



The FIVA gravity-fed IV bag alarming device.

feeling as much as we can. There is quite a creative vibe in the space."

The team works through the design process, digging deep into the nature of the problem, customer needs and user requirements. From there, the team moves into preliminary design through hand sketches, basic 3D modelling and CAD. As soon as they can, the engineers move into 3D/physical prototypes to provide clients with the ability to look, feel and assess the design. Using a 3D printer has radically changed the amount of re-work the team needs to perform.

"[3D printing] has gotten ideas moving quickly, but it has gotten ideas killed just as quick," Trower adds. "That is really important on the entrepreneur side of things. The quicker we can kill an idea the better... Having the ability to physically print, and give clients the product and say go use it. It comes back with positive results and often design changes."

The team then moves to full functional prototypes and optimizing design for manufacturing. This area is somewhat new for the company; understanding the manufacturing limitations and challenges, even in their own projects, has been very important in the company's success.

At any one time, the company is working on 10-15 different projects, from smaller 100-hour projects to 1,500-hour jobs. Trower explains that they are not building aircraft carriers or bridges, but are focused on preliminary detailed design.

Enginuity has partnered with a number of different companies over the years including Newfoundland-based Bluedrop, helping to develop a physical virtual trainer for the back half of the Chinook helicopter. The team has designed a school bus-size aluminum enclosure that is geometrically accurate to the helicopter and is in the second phase of the project.

The vast experience of the team, coupled with Garvey's personal interest, have given rise to Enginuity's harsh environment design focus, mixed with a can-do attitude.

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Canadian Floating Fence Corporation's XBOOM contains a hydraulic fluid spill in the North Saskatchewan River, near Drayton Valley, Alberta. The floating fence allowed a sphagnum moss product called Peat Sorb to absorb the fluid before it could disperse.

# LOWERING THE BOOM

Calgary firm's XBOOM floating fence technology deploys in minutes to contain oil spills.

Chemical spills on a river, lake or ocean shoreline are a top priority for Calgary entrepreneur Stephen Neal. He likes to tackle these accidents as quickly and completely as possible using his highly-effective containment technology. Now, with the help of the National Research Council of Canada Industrial Research Assistance Program (NRC-IRAP), he has been able to expand the potential of his approach and bring it to clients all over the world.

Neal's company, Canadian Floating Fence Corporation (CFFC), employs a portable containment system called XBOOM, which is made up of polypropylene mesh filters that can separate water and oil, as well as collecting material on and below the water's surface. Originally developed by his father in the 1990s, Neal established the firm in 2010 to commercialize and patent the system with his brother Mark.

Since then, they have found themselves travelling from one watery mess to another, where local observers have been regularly impressed with the speed and effectiveness of the resulting clean-up. In one case, hydraulic fluid from a construction site had leaked into the North Saskatchewan River, a problem that was reported in mid-afternoon and mopped up by Stephen and Mark before noon the next day.

"When the emergency management officer called back Alberta Environment to say the work was done, the gentleman on the other end of the phone said 'What did you do, send elves?'" Neal recalls.

He doesn't mind being regarded as the elf who magically meets even the most daunting of pollution challenges. Even when the problem doesn't look all that serious, the impact of his efforts can be profound. In 2016, for example, he was invited by representatives of the James Smith Cree Nation in Melfort, Saskatchewan to help them deal with an oil spill on the Saskatchewan River that was blamed on Husky Energy.

From shore, it was hard to see anything was amiss, Neal says, but the XBOOM and a sphagnum moss product called Peat Sorb sopped up large amounts of emulsified oil in short order. Just as importantly, he adds, the recovery shed new light on the scale of the problem.

"We weren't just containing an oil spill," he concluded. "We were collecting critical evidence."

Peter Beaulieu, the IRAP Industrial Technology Advisor (ITA) who has worked with Canadian Floating Fence since 2012, has watched XBOOM grow from something Neal was tinkering with in his garage to a sophisticated tool with a number of

different applications. It can be deployed in a matter of minutes with only a few people and a simple towing vessel, which makes it inexpensive to operate.

"It's very compact and out-of-the-way, but when they need it, it's there," explains Beaulieu. "They can just throw it in the water and it just shoots out. It's very quick and the technology is just incredible. Their customers and their partners really like it."

He worked through the Southern Alberta Institute of Technology (SAIT), an organization that collaborates with IRAP to help the business community with its research and development needs. SAIT offered Neal the use of its facilities to refine the XBOOM design and test a prototype with new capabilities, such as removing bacteria from the water.

The City of Edmonton was grateful for such progress in 2015, when a pond selected as part of an international triathlon event became overgrown with toxic blue-green algae that would have prohibited swimming. XBOOM made it possible to restore the water quality and allow the event to proceed.

"Our product, by design, can catch so many things, and not just cyanobacteria," says Neal. "We found that we can put a coating on it to pull out mercury."

That prospect has drawn attention from far and wide, including Canadian pulp mill operators who want their wastewater flow to meet government standards and American indigenous groups coping with the remediation of mining sites. CFFC has recently partnered with two First Nations business groups and



CFFC's XBOOM floating fence containing an oil spill in the Gulf of Paria near the Trinidad and Tobago parliament building in Port of Spain.

have just been awarded a contract from the United Nations Environment Programme to remediate the Ogoni Land oil spills in Nigeria.

Neal, for his part, has been logging a lot of air miles to meet the demand.

"We're cleaning up tailings ponds in Mexico, spills in Trinidad, we're doing a demonstration for the US Navy in Guam and Puerto Rico, it doesn't stop," he says. **DE**  
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*This story first appeared on the National Resource Council Canada's website: [www.nrc-cnrc.gc.ca](http://www.nrc-cnrc.gc.ca).*

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Developed by a team of McMaster University engineering students as their senior project, the sKan shows promise as a more reliable way to detect melanoma skin cancer before it turns deadly.

# Cancer sKanner

Canadian engineering students' thermal melanoma detector wins international design prize.

Melanoma, an easily preventable but aggressive form of skin cancer, is not only one of the most common and deadly but also trickiest cancers to detect. The problem is that melanoma can hide in plain sight, masked by moles and other benign blemishes, and thereby evades initial detection, which relies on a doctor "eyeballing" suspicious lesions.

As a consequence, it is, paradoxically, both easy to miss during a routine examination yet often needlessly tested for by biopsy, in the name of being better safe and sorry. In fact, the majority of biopsies return a negative result, yet an estimated 1,250 Canadians still die from melanoma annually or 3.4 deaths per day. In sunnier climates, like the U.S., those numbers climb to 9,730 deaths annually or one person per hour.

Given this, four McMaster University electrical and biomedical engineering grads (including Shivad Bhavsar, Rotimi Fadiya, Prateek Mathur and Michael Takla) hope to remove the uncertainty from skin cancer screening. As their senior project, they designed and built the sKan, an inexpensive handheld device designed to spot melanoma in its earliest and most treatable stages. According to the team's mentor, Dr.

Raimond Wong, who serves as Chairman of the Gastrointestinal Oncology Site Group at the Juravinski Cancer Centre, their project has potential well beyond the classroom.

"Current methods of detecting whether a lesion is melanoma or not is through the trained eyes of physicians – resulting in patients undergoing unnecessary surgery or late detection of melanoma," said Dr. Wong. "The sKan has the potential to be a low cost, easy-to-use and effective device, which can be afforded and adopted across health services."

He isn't the only one with high regard for the sKan. In November, the James Dyson Foundation named the McMaster University team as the winner of the international James Dyson Award, an annual competition that recognizes the next generation of design engineers and their inventions. To win the international competition's \$50,000 prize, the sKan team beat out national Dyson Award winning projects from 23 countries.

What set the sKan project above the rest, James Dyson said, was their clever use of inexpensive components to create a potentially life saving device. The sKan takes advantage of the fact that cancer cells release more heat than healthy cells. Cancerous

tissue regains heat faster, after a patch of skin has been cooled, which can indicate a strong likelihood of melanoma.

"In its early stages, melanoma is harmless and its removal is easy but, if left undetected, it can become quickly lethal," says Michael Takla. "Knowing that, we came across research in our fourth year showing that it could be detected by looking at thermal recovery... so we asked why that technique hadn't been used previously."

"We found that this approach had only been employed with high-end infrared cameras that cost between \$10,000 to \$200,000, which is too expensive for a family physician to incorporate into their clinic," he adds. "So that's what we tackled: Create a device that uses the same thermal principle but make it affordable."

To detect that rise in temperature, the sKan uses a small transducer with an array of 16 thermistors laid out in a grid pattern. Pressing the hand-held device to cooled skin allows the sensors to detect which cells return to normal temperature fastest. A conditioning circuit filters and amplifies the sensors data before a microcontroller unit digitizes it.

The conditioned signal is then sent to a computer that formats and fits the signal to the thermistors' parametric curves and displays the results as a heat map and temperature difference over time. Provided this data, doctors and other medical personnel would be able to quickly assess the presence, or absence, of



From left: McMaster University engineering grads, Prateek Mathur, Shivad Bhavsar, Rotimi Fadiya and Michael Takla, winners of the international James Dyson Award. (Photo credit: James Dyson Foundation.)

melanoma. All told, Takla says the component cost for the sKan totalled approximately \$1,000 for the prototype device.

"Our next step will be to enter a more intense prototyping phase," Takla says. "That will include improving the quality and resolution of the thermistors, reducing the electrical noise as much as possible and improving our detection algorithm. After that, the goal is to enter pre-clinical testing over the coming months to a year."

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# JUST WHAT THE DOCTOR ORDERED

**BD Rowa Technologies' robotic pharmaceutical storage system makes it easier for pharmacists to provide quality when retrieving medication.**

By Lindsay Luminoso

Automation is rapidly making its way into every industry and the medical sector is no different. With an aging population, heavily reliant on the medical sector and the thousands of medications prescribed annually, it is no wonder the industry is looking for better ways to organize and dispense pharmaceuticals. According to the Kaiser Family Foundation, the number of retail prescription drugs filled at pharmacies last year totalled more than 4 billion in the U.S. alone.



The Rowa Vmax system automates pharmacy storage, sorting and dispensing of medication packages to pharmacists.

With space at a premium, especially in smaller, local pharmacies, only the most popular and necessary medications are kept on hand. Not having the correct prescription in stock can lead to health concerns for patients as well as economic challenges when customers decide to go elsewhere. Providing customers with the incorrect prescription, dose or an expired item can have fatal consequences.

To address these challenges, Rowa Technologies, a German-based division of medtech firm BD, has designed a range of pharmacy-oriented systems to automated drug delivery.

"We've been in the midst of the digital future for some time now," explains Dirk Bockelmann, head of international sales at BD Rowa. "And from our perspective, it offers enormous potential for the pharmacy market."

Often ordering in bulk, a pharmacist is required to manually sort, catalogue and shelve hundreds of bottles and boxes that arrive on a daily basis. With behind-the-counter shelving space at a premium, these boxes and bottles need to be arranged to maximize space and organized enough that a pharmacist can easily find it and dispense it to customers.

In larger chain pharmacies, pharmacists have quotas to dispense medication in a limited time to maximize customer retention. This added pressure could lead to mix ups and mistakes that can have dire consequences.

Recognizing these challenges, Rowa Engineers saw this as an opportunity to develop the Vmax pharmacy robot, designed to sort and store prescription medicines, as well as overstock, OTC medications, plastic-wrapped packages and refrigerated items. The OEM's four different systems (Vmax 130, Vmax 160, Vmax 210 and Vmax 320) offer a number of different configurations and features to meet the needs of any pharmacy, no matter the size.

Rowa boasts the Vmax offers the optimal use of space, with up to 4,000 packages per running meter. Depending on the configuration, the system has the capability to store up to 56,000 packages in a compact footprint (the smallest Vmax measures 3.16m x 1.33m x 2.1m), but can be tailored to fit any back-end of a store. Inside the enclosure, the boxes/bottles are stored to maximize space and new packages can be added without having to reorganize existing stock. The system is able

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to recall the position of any item based on batch number and expiry date, optimizing the workflow.

When a shipment comes in, the pharmacist can place packages in the input station. For a fully automatic input, the system includes the ProLog/iProLog feature, which enables the user to dump a large number of packages into a bin with a conveyor that moves the packages to the unit's robotic arm with gripper, where the package is measured, scanned – both barcode and expiry date – and input into the Vmax. This feature allows for lights-out operations of stock inventory, sorting approximately 120 packages per hour.

The Vmax comes with HD-Multi Picking head technology to ensure smooth and accurate transfer of up to six square, round and wrapped packages from the input stage to proper storage section. Upon request, the picking head can return a package to the output station in eight to 12 seconds. With a capacity of up to 56,000 packages, the picking head has its work cut out for it.

When designing this essential workhorse, Rowa engineers grappled with many considerations. The picking head, first and foremost, needed to be fast. The goal of the system is to speed up operations for optimized efficiency. The picking head needed to work faster than a human counterpart.

Another challenge for the team was designing the robotic arm so that it could move vertically, horizontally and toggle between two opposite shelves without dropping packages or bumping into the shelved packages.



The Vmax HD-Multi Picking head technology ensures smooth transfer of packages thanks to igus' drylin high helix thread and plastic nut.

The Rowa team was also concerned with ensuring cleanliness within the enclosure. Dealing with the medical industry, these highly sensitive products could not be introduced to contaminants. When it comes to designing medical systems, noise considerations are always taken into account, especially if this system located near customers, the system should not be loud or bulky.

To solve these challenges, the Rowa engineers looked to igus, a German-based company that provides complex technical polymer components.

"I got in contact with the chief engineer [at Rowa] and tried to convince him [to use] a new dryspin lead screw geometry," explains Stefan Niermann, head of business unit – drylin lin-

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ear & drive technology at igus. "We were able to promise him a better product than the current solution for even less money."

The drylin high helix thread offers a ratio of diameter (14mm) to inclination (25mm) that ensures precise linear movement onto shelves. The Rowa engineers incorporated this custom igus product into the picking head to give it smooth horizontal movement, placing boxes and bottles onto the shelf, with speed and agility.

According to Niermann, the engineers were previously using a 12mm diameter lead screw but the new 14mm diameter provided longer lifetime and higher precision at a lower cost. And as the relationship progressed, igus demonstrated that the picking head could include an even longer lead screw due to this bigger diameter, making the system more configurable and allowing for more packages to be collected.

Another benefit of this product is the plastic nut. Rowa engineers opted for this igus product because it enables the system to operate with less than half the friction of competing parts with no lubrication needed, making it contaminant free and requiring little maintenance.

"When you compare ball screws with lead screws, lead screws are much cheaper and also make less noise," Niermann adds. "They also need no lubrication if they are done from igus plastics. And any kind of noise is [problematic] in medical environments." Rowa engineers boast that the picking head is extremely quiet with an average sound pressure level of Lp(m) 48.3 db (A).

Beyond the drylin high helix thread and plastic nut system for the horizontal movement, igus also provided the drive components to meet these demands. Custom-made linear guides as well as energy chains to supply power were incorporated into these automatic machines.

Rowa required short working cycles and very tight bend radii on both side and order to achieve this, the company opted for pre-harnessed, ready-to-install "readychains" systems with chainflex cables. This provides the robotic arm with power to the motor that drives the lead screw allowing it to move gracefully throughout the enclosure.

Providing innovative solutions has enabled igus to expand their relationship with Rowa, providing additional products such as igus' oil-free drylin W and drylin T linear guide systems for the Vmax attached features.

With all of these engineering considerations, Rowa was able to design a system tailored for small to large-sized pharmacies with necessary add-on features to make it easier for pharmacists and customers to get the care and medications they need.

"Service offerings make pharmacies more competitive nowadays," explains Björn Schleheuser, Head of Sales for Central Europe at BD Rowa. "The focus should always be on offering the pharmacy customers the optimal solutions for their requirements." DE

[www.bd.com](http://www.bd.com)

[www.igus.com](http://www.igus.com)

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# INDUSTRY OUTLOOK

## 2018



Canadian Fluid Power Association (CFPA) predicts optimistic outlook for 2018.

By Ron Dusseldorp

**A**s the year draws to a close, it appears 2017 will have been a good year for the fluid power industry. The CFPA's recent Market Outlook, presented by the Market Insight Committee, indicated a generally optimistic perspective going into 2018. As well, 2017 has been a very good year for the CFPA. Progress was made on many fronts as the association continued to build value for members, and there are plans to keep the momentum high.

At CFPA's core are member companies who are "giving back" to their industry by providing resources and encouraging employee participation in the association. Members and non-members generally agree on the largest challenges within the fluid power business. Those challenges include a lack of available employees with a technical background – let alone fluid power knowledge – and uncertainty about the future of investing in and planning for Industry 4.0.

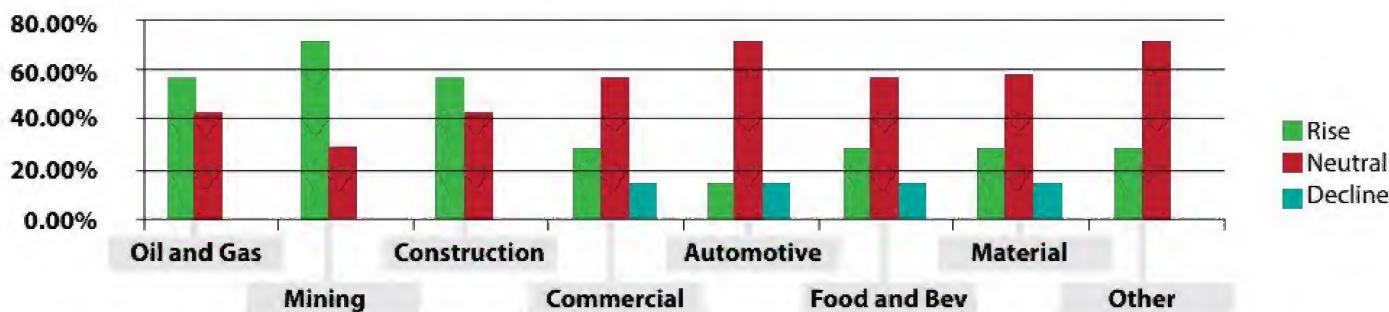
CFPA committees are well aware of industry concerns and each pillar addresses these issues. The CFPA's Education Committee has been busier than ever, now working on two Fluid Power Challenge events. The 2017 Canadian Fluid Power Challenge was yet another overwhelming success, which provided Grade 7 and 8 students with hands-on experience building a controlled mechanism with real world applicability, and to open their eyes and those of their teachers to technology careers

and, in particular, careers in fluid power. The Challenge is an excellent complement to the science and technology curriculum at these grade levels. The 2018 Challenge, in May of next year, will see a new logo for the event.

The newly created national version of the Fluid Power Challenge, called the National Fluid Power Challenge, allows students anywhere in Canada to participate. Logistically, it is much less complex than a local challenge because it allows single participating schools to go through the whole process independently of the other schools involved. Registration is currently ongoing for the National Challenge, and we encourage all interested school to sign up before the end of November.

The National Challenge starts with a teacher guiding a class of students, broken into four-member teams, through a set of workshop lessons, which can take place over a number of days or weeks. These lessons reinforce the students' knowledge of fluid power concepts, introduces them to the tools and materials they can use to build devices and gives them some practice building simple fluid power devices. On the actual Challenge Day, the selected teams have three hours to build, test and refine their device. Then the teams demonstrate their devices during a two-minute period that is recorded and submitted as an entry. Winners are then chosen by CFPA officials.

### What do you expect will happen to the following industries over the next 12 months:



Our Market Insight Committee continually strives to be the Canadian leading source of fluid power market information with programs and tools that analyze industry trends, determine industry size and industry segmentation, define markets, develop industry outlooks and help companies plan their next move.

The association's market report help companies track whether they are ahead of, with or behind industry norms. It also helps CFPAC members gain insight into areas of growth, both by region and industry.

The CFPAC's Industrial Relations Committee provides an information conduit to its members regarding fluid power industry regulations and certifications, and helps members keep up with regulatory requirements and standards that impact on the industry.

Regional Events Committee members plan networking events, including regional and national business meetings, social events and golf tournaments. The Annual General Meeting is a must attend for senior management teams of fluid power companies, which rotates venues across the country at breathtaking locations. The general meeting includes a series of activities to sharpen attendees' minds and allow them to subsequently unwind in the company of peers, who are most often leaders in both their companies and fields.

The Communications committee ensures the CFPAC is well promoted on most major social media platforms, which

strengthens brand image and provides channels of communication to members. The CFPAC's Twitter following alone has grown five-fold in just over a year, and LinkedIn has been growing rapidly as well. The association has also created a new Facebook page, which is a great place to connect and share with fellow Canadian fluid power professionals.

The past year has seen the adoption of several technologies to enable the association to better work and communicate. Cloud computing has enabled work-sharing and file storage between members and directors from coast-to-coast. Additionally, the adoption of web-based webinar software allows us to hold online events for those unable to attend CFPAC meetings.

Whether you have been in the Fluid Power industry for many years or are just beginning your career, whether your technology is connectors, hydraulics, pneumatics or a combination, whether you want to shape the future of or improve one aspect of this industry, consider joining an organization of like minded people with a common interest. There is much to be done; a large inclusive membership is a cornerstone.

Together we can make a difference. **DE**  
[www.cfpac.ca](http://www.cfpac.ca)

*Ron Dusseldorp is the Chairman of the CFPAC's Membership Committee and the Division Business Development Manager at Parker Hannifin Canada.*



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## Automation

### IIoT Gateway

Moxa launched its IIoT Gateway Starter Kit, which includes built-in support for Amazon Web Services (AWS). The kit includes a ThingsPro Gateway with a Modbus framework to connect with Modbus RTU/TCP devices and SCADA systems. It includes support for 4G connectivity, wireless failover, firewalls and VPN. The gateway also features built-in client support for services such as AWS IoT and Cirrus Link Sparkplug. The AWS IoT Device SDK lets users set up tags and devices on AWS IoT and transfer field data to various AWS cloud services for data storage and processing. The gateway's built-in Cirrus Link Sparkplug SDK lets users connect to the Inductive Automation Ignition Platform or another MQTT server. The kit also includes a UC-8112 Edge Computer with a 1 GHz ARM processor, 512 MB RAM, two LAN ports and two serial ports. Featuring a wide operable temperature range (-40 to 75°C), the edge computer can use a range of wireless accessories to add LTE or Wi-Fi connectivity if needed.

[www.moxa.com](http://www.moxa.com)



### Magnetic Gripper

SCHUNK released its EGM-M monopole gripper. Measuring 26mm by 98mm, the digitally controllable, magnetic gripper is suitable for handling parts weighing up to 10kg. Using electro-permanent magnets, the EGM-M requires a current pulse for 300ms for actuation and deactivation and therefore maintains its grip in the case of an emergency stop or a sudden loss of power. The SCHUNK EGM-B bi-pole gripper is designed for handling heavy and complex ferromagnetic parts and is available with one, two, or four pole pairs in different arrangements. The EGM series have a gripping force of 1.2 and 22.5kN, and is designed for parts weighing a maximum of 147kg, with a material thickness starting from 3.5mm. For handling of thin sheets, the gripping force can be reduced in eight stages with an additional control unit.



[www.us.schunk.com](http://www.us.schunk.com)

## Motion Control

### IO-Link Master

Balluff introduced a 4-port version of its 8-port IO-Link master that is available for EtherNet/IP, PROFINET and EtherCAT industrial networks. The IP67 protection rated, machine-mount, 4-port slim IO-Link master is offered in IO-Link Type A or Type B port con-

figuration. Functionality between Type A and Type B differs in the way output power (or aux power) is configured for each IO-Link master port. With 9A of total available current at 24VDC, the Type A master can host up to 124 configurable I/O points or 4 IO-Link enabled smart sensors and 4 additional I/O. The Type B Slim IO-Link master, with the same power capacity, is suited for connecting IO-Link valve manifolds or devices that require galvanic isolation for output power like needle grippers.

[www.balluff.com](http://www.balluff.com)



#### Box Controller

Nippon Pulse unveiled its FMAX-4X-2SD, a box controller for up to four axes of movement, with built-in servo drivers for the X and Y axes. The X and Y axes can control rotary and linear brushless motors; the Z and U axes can control other types of motors by connecting additional drivers. The controller is capable of performing 2-4 axis linear interpolation and 2-axis circular interpolation. It also features 13 types of homing, on-the-fly speed and positioning adjustments, absolute and incremental positioning and S-curve and trapezoidal motion profiles. The controller box can be built into a fully functioning two-axis system with just a power supply, motor and cable. It can also function as a standalone unit, with a USB connection to a PC, or with a joystick for jog applications.

[www.nipponpulse.com](http://www.nipponpulse.com)



#### Motion Controller

PI (Physik Instrumente) released its C-884.6DC, a 6-axis servo motor controller. The unit can run brushless servo motors and traditional DC motors with closed loop feedback provided by incremental encoders and absolute encoders (BiSS protocol). USB, TCP/IP and RS-232 interfaces are standard for command communication. Additional interfaces include programmable analog and digital I/O lines, an SPI display port and joystick port. The controller's dual-core architecture provides separate command processing and position servo control functions. It also features point-to-point and vector motion with user-definable trajectories; a trapezoidal velocity profile; and a data recorder with nonvolatile storage for motion system analysis. Software support includes LabVIEW, MATLAB, C, C++, C# and VB.NET, as well as a Python macro command language for stand-alone operation.

[www.pi-usa.us](http://www.pi-usa.us)



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### Brushless DC Motor

Maxon released its EC-i line, a series of 52mm brushless DC motors with an iron-wound internal rotor redesigned from 7 pole pairs to 8 pole pairs. Available in three voltage outputs (i.e. 18, 24 and 48V), the 180W motors produce up to 6,000 rpm. With a correspondingly optimized magnet ring, the EC-i motors offer a very high torque density and a low cogging torque, the company says. The motor's design features a welded stainless steel flange and housing, making this brushless DC motor suitable for a wide range of applications such as rotary actuators, valves, robotic joints and process control. [www.maxonmotorusa.com](http://www.maxonmotorusa.com)

### Fluid Power



### Solenoid Valves

Festo unveiled its VUVS-...-S and VUVG-...-S solenoid valves. The VUVG-...-S is suited to small parts assembly, electronics, food and packaging applications, as well as tight installation spaces. It can be ordered with IP40 or IP65 protection. The VUVG-...-S is available as an electrically or pneumatically actuated valve and can be expanded to form a valve terminal with an individual connection. According to the company, the VUVS-...-S covers up to 80% of all harsh environment applications. It can be used with an operating pressure of 2-8 bar and a flow rate of up to 1000 l/min and is suitable for use in a temperature range of -5°C to +50°C.

[www.festo.ca](http://www.festo.ca)

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### Ultra-Flat Cylinders

Enerpac unveiled its new CUSP-Series and CULP-Series high-tonnage ultra-flat cylinders designed for harsh conditions. The CUSP-Series has an integrated tilting function with 10 to 1,000-ton capacity, 0.26-0.69 inches stroke and maximum operating pressure of 10,150 psi. The CULP-Series has an integrated stop ring with 10 to 50-ton capacity, 0.24 inches stroke and maximum operating pressure of 10,150 psi. CUSP-Series features include pp to 4 percent side load capacity and tilting function up to 4 degrees. Both series feature a nitrocarburized surface and a "red line" or stop ring for maximum stroke limitation.

[www.enerpac.com](http://www.enerpac.com)

### Load-holding valves

HAWE Hydraulik unveiled its LHV series of load-holding valves, designed for low and medium vibration-prone applications as well as its type LHDV, for systems highly suscep-



tible to vibrations, such as large fire trucks or bridge inspection units. These series join the company's more than 1000 variants that are based on 4 sizes and cover a flow rate range of 4 to 350 l/min. Depending on whether energy efficiency or stability is of particular importance in the application, control ratios of 2:1 to 24:1 are possible. Various vibration damping options are available to add stability in operation.

[www.hawe.com](http://www.hawe.com)

keeping with these additions, there is also a device-side flange socket. Like all new HARTING M12 flange sockets, it is suitable for the M12 PushPull but offers reverse compatibility with screw locking. Side cable exit reduces the distance from the housing door to any switches.

[www.harting.com](http://www.harting.com)



## Electrical



### Push-in wire connectors

BlockMaster Electronics released its WPC300 Clear Connects Series, a line of transparent push-in wire connectors that provide visual confirmation of connection. The line also comes with a Strip Guide for users to check proper length to strip wire. The connectors accept solid and tinned stranded wire 22-12 AWG, and have a built-in slot for access to test the circuit. Clear Connects are copper, color-coded and touch-safe (i.e. wires shrouded by the connector housing). The new connector series has multiple international and domestic agency approvals, including UL and CUL.

[www.blockmaster.com](http://www.blockmaster.com)

### M12 Connectors

HARTING debuted the latest versions of its M12 PushPull connector. Previously offered in a straight version with A, D and X coding and male socket, the line now offers angled housing shapes and female versions. In

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### Shielded Control Cable

AutomationDirect now offers flexible multi-conductor control cable in shielded and unshielded versions ranging in sizes from 18 to 10 AWG and with three to 41 conductors (including green/yellow ground). Individual stranded copper conductors have black PVC/Nylon insulation and are marked with identification numbers. With a TPE outer jacket, cables are available in 50, 100, 250, 500 and 1,000-foot reels. Shielded versions include both an overall aluminum mylar foil tape with drain wire and tinned copper

braid. The cables are resistant to sunlight, oil and moisture penetration, and are suitable for wet and dry, indoor and outdoor locations. The control cables are UL and CSA approved and RoHS compliant.

[www.automationdirect.com](http://www.automationdirect.com)



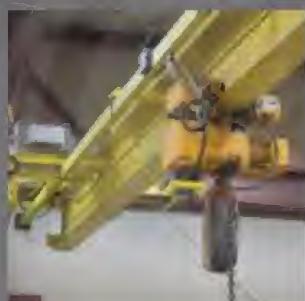
### Servo Cable

Lapp Group USA introduced its ÖLFLEX SERVO 7TCE, a flexible, oil-resistant servo cable with TC-ER approval. The cable features a thermoplastic elastomer (TPE) jacket, as well as cross-linked XLPE insulation, that can withstand high temperatures up to 105°C. In addition to being UV- and oil-resistant, the 7TCE is flame retardant and can resist harsh cleaning solutions. The cable also features a low-capacitance design that handles nominal voltages of 600V (UL TC-ER) and 1,000V (UL Flexible Motor Supply) and a minimum bend radius of 6x cable diameter. The cable is compliant with UL TC-ER, c(UL) CIC, CE and RoHS.

[landing.lappusa.com](http://landing.lappusa.com)



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## Power Transmission

### Belt Drive Axes

For simple positioning tasks, igus unveiled its drylin ZLW eco, an entry-level toothed belt axis. The axis' carriage and shaft end supports are produced by injection molding, while the sliding carriage uses plain bearings made from iglide plastics. The drylin ZLW eco has two installation sizes (0630 and 1040) that weigh 0.3kg and 0.7kg and can move loads up to 3kg or 10kg respectively. The base is an anodized drylin W profile made of clear anodized aluminum. A neoprene toothed belt, tensioned between the plastic shaft end supports, pushes and pulls a solid plastic carriage with a positioning accuracy of 0.3mm. Stroke lengths can be adjusted by the user.





### Caliper Brakes

Nexen Group, Inc. now offers three models of its BD (brute disk) caliper brakes: Air actuated, spring actuated/air released and spring actuated/hydraulically released. The series' design utilizes arms to provide clamping force with torque ranges from 8,000 to 23,000 in-lbs. for disc diameters from 12 to 24 inches. Connections can be rotated 360° around actuator axis, and all pivot points have life lubricated bearings. Brake shoes are mounted with detent pins and larger, curved brake shoes are available to provide more contact area. Features of BD caliper brake, depending on model, also include: Maximum disc speed of 3200 RPM, 0.50 to 1 inch disc thickness and bushing compatible for shafts up to 3.875 inches.

[www.nexengroup.com](http://www.nexengroup.com)

### Sensors



### Multi-Turn Sensors

Novotechnik U.S. introduced its ML Series of Multi-Turn Rotary Sensors that feature a friction clutch instead of end-stops. The clutch produces a click sound to let users know they have reached end-of-range and it permits continued turn past end-scale. Compact in size, ML series sensors have a ½ inch square profile. Other specifications include models with 6, 10, 25, 50 or 100 turns, bushing mounting and sealing to IP 65. Life is >15 million turns. Linearity is to ±0.25% of full scale range. Resolution is better than 0.1% with repeatability of ≤ 0.17%.

[www.novotechnik.com](http://www.novotechnik.com)

### Inductive Rotary Encoder

HEIDENHAIN released its ECI 4000, an absolute inductive rotary encoder designed specifically for robotics, medical technology and drive technology applications. With hollow shaft diameters of 180mm, the modular system features a scale drum, a separate scanning unit and mounting characteristics specific for use in robots. According to the company, the ECI 4000 improves the absolute position accuracy of the tool center point on industrial robots by up to 70% to 80%. In addition, HEIDENHAIN released its LIC 4000 absolute linear encoder and a ECI 4000 encoder version for a hollow-shaft diameter of 90mm. The company also offers the ECI/EQI 1100 without bearing (diameter of 37mm) and ECI/EQI 1300 (diameter of 65mm). All variants support safety integrity level SIL 2, category 3 PL d.

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### Linear Position Sensors

POSITAL extended its range of LINARIX linear position sensors with a low-cost version that uses plastic draw wire assemblies in place of the metal components. All LINARIX sensors consist of a draw wire spool mechanism coupled to a rotary

encoder, incremental or multi-turn absolute. As the wire is pulled out of the device, the rotation of the spool is tracked by the encoder. Both plastic and metal-cased LINARIX linear position sensors are available in a range of output interface options, including analog (voltage or current) and digital interfaces (e.g. CANopen, DeviceNet, J1939, Ethernet POWERLINK, Modbus, Profibus DP, EtherNet/IP, PROFINET IO, SSI and incremental). The plastic draw wire sensors are available in 1.25m, 2.4m and 7.5m measurement ranges.

[www.posital.com](http://www.posital.com)

### Data Acquisition



#### Data Logger

In partnership with CAS DataLoggers, dataTaker launched its DT80W Intelligent Datalogger, which integrates a WiFi and GSM cellular modem. The unit accepts up to 15 analog ( $\pm 50V$ ) sensor

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inputs but is expandable to 300 analog inputs. It also has 12 digital terminals along with two serial 'Smart Sensor' ports and programmable analog output. The datalogger's Ethernet connectivity allow the unit to automatically transfer data via email or FTP and send alarms via SMS or email. DT80W also features an integrated Web and FTP client/server and USB memory for data and program transfer.

[www.DataLoggerInc.com](http://www.DataLoggerInc.com)



### Remote Data Logger

Paralan introduced its Teracom TCW220 Ethernet Data Logger for remote automation and industrial controls. The unit has two analog inputs, with 10-bit resolution and two discrete inputs. It supports a 1-Wire interface for up to eight Teracom 1-Wire sensors. All monitored parameters can be logged on previous set time intervals and/or on alarm conditions. Its memory can hold up to 70,000 records and its log file can be periodically uploaded on a dedicated server using HTTP Post. The relays can be activated either remotely (WEB, SNMP, HTTP, MODBUS TCP/IP, etc.) or locally – providing status of monitored parameters. For every parameter, email and SNMP trap can be sent to up to five recipients. Alarm alerts also can be sent by HTTP Post with XML/JSON status files.

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